FUTV4501 QPSK Modulaotr

User's Manual

NMS Version: V4.01

SW: V0.05

HW: V1.0

FMUSER International Group Inc.

DIRECTORY

Chapter 1 product outline

1.1 Outline

The FMUSER FUTV4501 QPSK modulator is a high performance modulator developed according to DVB-S (ETS300-4221) QPSK standard. It has powerful spectral efficiency, advanced anti-jamming and competitive price-performance ratio. Apart from these, this modulator also has access to FM microwave device. Moreover, to guarantee the high transmission performance, this QPSK modulator adopts the disposal of energy diffusing, RS coding, convolution interlacing and pre-modulated baseband shaping. To sum up, all the approaches make this FUTV4501 QPSK modulator can be widely used in Broadcasting, Interactive Services, News Gathering and other Broadband satellite applications.

1.2 Features

l   Fully complying with DVB-S (ETS300-421) QPSK standard

l   Output frequency range: 950~2150MHz

l   ASI standard Input connector

l   Supporting local and remote control

l   Output level attenuation

l   High stability and powerful anti-jamming performance

l   Full-size front panel LCD display and keyboard

1.3 Specifications

| Modulation	QPSK
Input	ASI Standard connector
Output	50 F Type
RF Range	950~2150MHz
Symbol Rate	1.5M~45Mps
Roll-off factor	Option 0.35 0.25 0.20
Convolution	Option 1/2 2/3 3/4 5/6 7/8
Output level range	0~20dB in 1dB step
Environment	0 ~ 45 operation -20 ~ 80 storage
Power Supply	~220V(~180V-~250V) 50Hz~60Hz 20VA
Dimension	44mm×482mm×430mm(H*W*D)

1.4 Principle chart
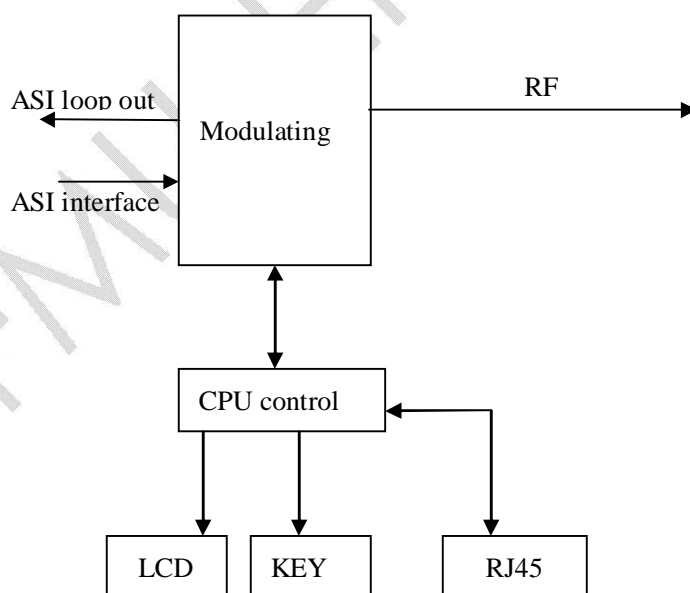
1.5 Appearance and description

Front Panel Illustration
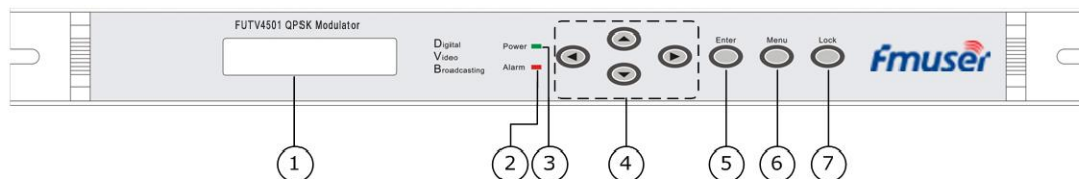
1.	LCD Display
2.	Alarming Indicator (It will light on when QPSK modulator works at current mode.)
3.	Power Indicator (It will light on when QPSK modulator works at current mode.)
4.	Up/Down/Left /Right key
5.	Enter: Confirmation key
6.	Menu key
7.	Locking key

Rear Panel Illustration
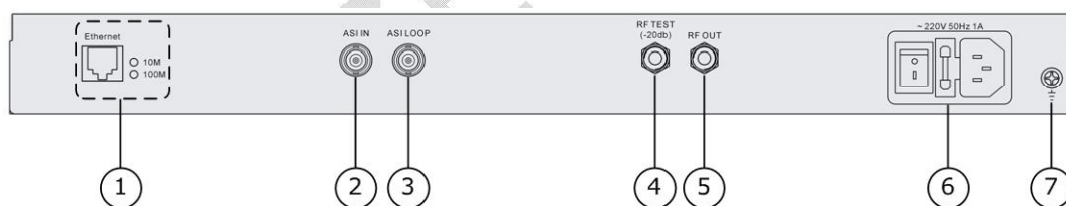
1.	Network Interface
2.	ASI1Input
3.	ASI1Loop Output
4.	RF TEST
5.	RF Output
6.	Power Socket
7.	Grounding Pole

Chapter 2 Installation Guide

2.1 Acquisition Check

When user opens the package of the device, it is necessary to check items according to packing list. Normally it should include the following items:

l   FUTV4501 QPSK modulator

l   User's Manual

l   ASI Cable

l   Power Cord

If any item is missing or mismatching with the list above, please contact local dealer.

2.2 Installation Preparation

When users install device, please follow the below steps. The details of installation will be described at the rest part of this chapter. Users can also refer rear panel chart during the installation.

The main content of this chapter including:

l   Checking the possible device missing or damage during the transportation

l   Preparing relevant environment for installation

l   Installing modulator

l   Connecting signal cables

l   Connecting communication port (if it is necessary)

2.2.1 Device's Installation Flow Chart Illustrated as following
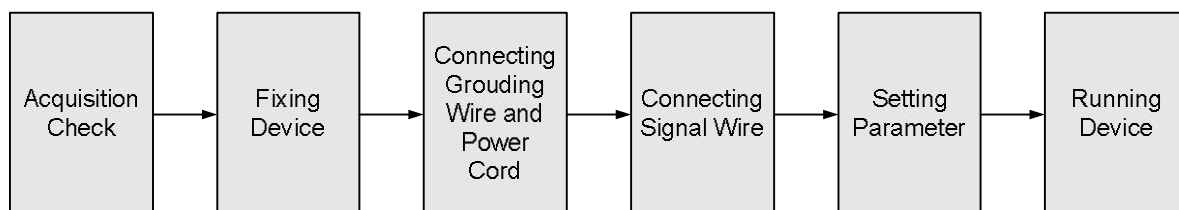
2.2.2 Environment Requirement

Item	Requirement
Machine Hall Space	When user installs machine frame array in one machine hall, the distance between 2 rows of machine frames should be 1.2~1.5m and the distance against wall should be no less than 0.8m.
Machine Hall Floor	Electric Isolation, Dust Free Volume resistivity of ground anti-static material: $1X10^7$~$1X10^{10\Omega}$ Grounding current limiting resistance: 1M (Floor bearing should be greater than 450Kg/)
Environment Temperature	5~40 (sustainable) 0~45 (short time) installing air-conditioning is recommended
Relative Humidity	20%~80% sustainable 10%~90% short time
Pressure	86~105KPa
Door & Window	Installing rubber strip for sealing door-gaps and dual level glasses for window
Wall	It can be covered with wallpaper, or brightness less paint.
Fire Protection	Fire alarm system and extinguisher
Power	Requiring device power, air-conditioning power and lighting power are independent to each other. Device power requires AC power 100-240V 50-60Hz. Please carefully check before running.

2.2.3 Grounding Requirement

l   All function modules' good grounding is the basis of reliability and stability of devices.
     Also, they are the most important guarantee of lightning arresting and interference
     rejection. Therefore, the system must follow this rule.

l   Coaxial cables' outer conductor and isolation layer should keep proper electric
     conducting with the metal housing of device.

l   Grounding conductor must adopt copper conductor in order to reduce high frequency
     impedance, and the grounding wire must be as thick and short as possible.

l   Users should make sure the 2 ends of grounding wire well electric conducted and be
     antirust.

l   It is prohibited to use any other device as part of grounding electric circuit

l   The area of the conduction between grounding wire and device's frame should be no
     less than 25mm^2.

2.2.4 Frame Grounding

All the machine frames should be connected with protective copper strip. The grounding
wire should be as short as possible and avoid circling. The area of the conduction
between grounding wire and grounding strip should be no less than 25mm^2.

2.2.5 Device Grounding

Connecting the device's grounding rod to frame's grounding pole with copper wire.

2.3 Wire's Connection

The grounding wire conductive screw is located at the right end of rear panel, and the power switch, fuse, power supply socket is just beside ,whose order goes like this, power switch is on the left ,power supply socket is on the right and the fuse is just between them.

l   Connecting Power Cord

User can insert one end into power supply socket, while insert the other end to AC power.

l   Connecting Grounding Wire

When the device solely connects to protective ground, it should adopt independent way, say, share the same ground with other devices. When the device adopts united way, the grounding resistance should be smaller than 1 .

Ｆ **Caution:**

Before connecting power cord to FUTV4501 QPSK modulator, user should set the power switch to "OFF".

2.4 Signal Cable Connection

The signal connections include the connection of input signal cable and the connection of output signal cable. The details are as follows:

2.4.1 ASI input and loop output cable illustration:

2.4.2 RF output interface connection

User can firstly find the RF out interface on the device according to the connector mark described on the rear panel illustration, and then connect the coaxial cable (in the accessories). One end is connected to the modulator's RF out connector while the other end to the power transmitter's RF input. The modulator's RF output interface (F type) and its connection are illustrated as follow:

Chapter 3 Operation

FUTV4501 QPSK modulator's front panel is user operation interface. Before operating, user can decide whether directly use the default setting or customize the input and output parameters setting. The detail operations go as follows:

Keyboard Function Description:

MENU: Canceling presently entered value, resuming previous setting; Return to previous menu.

ENTER: Activating the parameters which need modifications, or confirming the change after modification.

LEFT/RIGHT: To choose and set the parameters.

UP/DOWN: Modifying activated parameter or paging up/down when parameter is inactivated.

LOCK: Lock the screen / cancel the lock state. After pressing lock key, the system will question the users to save present setting or not. If not, the LCD will display the current configuration state.

At the "Resume Factory Setting" page, user can firstly press "ENTER" key, consequently system resumes factory parameter setting.

3.1 Main Interface

After switching on the modulator, the LCD will display the company name, device name in the first row, while the output RF frequency and TS in the second row.

```
DeSai              QPSK4501
0950.0MHz          00.00Mbps
```

3.2 General setting

By pressing "LOCK" key to enter the main menu, the LCD will display the following page.

```
1 Input Setting
2 Output Setting
```

By pressing UP or DOWN key, the LCD will display the following pages:

```
3 NIT Option
4 Network Setting
```

```
5 Saving Config
6 Loading Config
```

```
7 Version
8 Language
```

By pressing UP or DOWN key to the specified menu item, then pressing ENTER to enter the submenu as following pages:

3.2.1 Input setting

```
1.1 Input Interface
    ASI
```

There is only ASI input interface option for this QPSK modulator.

3.2.2 Output setting

By pressing UP/DOWN to choose this item, ENTER and UP/DOWN or LEFT/RIGHT to set the parameters. The system displays following pages in turn:

3.2.2.1 Freq setting

After entering the submenu by pressing ENTER key, user can set RF output frequency. The RF output frequency range is from 950 to 2150MHz.

```
2.1 freq setting
    0950.00MHz
```

3.2.2.2 Symbol rate

```
2.2 symbol rate
    27.500Msps
```

Range: 0-45M@ QPSK Constellation

3.2.2.3 Roll off factor

```
2.3 Roll off coeff
    0.35
```

User can set the roll-off factor of the QPSK modulator by pressing ENTER into the submenu and paging UP/DOWN key to set the value.

There are 3 possible options, including 0.35, 0.25 and 0.20.

3.2.2.4 RF ATT setting

```
2.4 RF ATT setting
   06.0                    db
```

User can set the attenuation of the RF output at this submenu. The RF attenuation range is from 0-20db in 1db step.

3.2.2.5 Convolution

```
2.5 Convolution
    7/8
```
```
2.5 Convolution
   1/2    [2/3]   3/4   5/6   7/8
```

User can set convolutional value at this submenu.

The possible options include 1/2, 2/3, 3/4, 5/6, 7/8.

3.2.3 NIT Option

User can decide whether to insert a NIT table in this submenu. More interpretations about the NIT insertion will be interpreted in section 4.3.2.

```
3.1 NIT Insertion
    YES            *NO
```

3.2.4 Network setting

By pressing "Up/Down" to choose this item, "Enter" and "Left/Right" to set the parameters. The system displays following pages.

```
4.1   IP Address
        192.168.000.136
```

```
4.2   Subnet Mask
        255.255.255.000
```

```
4.3   Gateway
        192.168.000.001
```

```
4.4   Console Address
        192.168.000.221
```

```
4.5   MAC Address
        f f f f f f f f f f f f
```

Note: The MAC address is according to the factory setting, and it's unique.

Under the following submenus, there are parameters which can be set manually; user can press "Up/Down" to choose this item. "Enter" and "Left/Right" to set the parameters. The system displays following pages.

3.2.5 Saving config

User can choose to save the current configured parameters by pressing ENTER key. The system displays following page:

```
Saving, please wait:
 >>>>>>>>>>
```

3.2.6 Load config

At this menu, press UP/DWON key and ENTER to confirm.

6.1 Load Saved CFG

6.2 Load Default CFG

User can restore the device into the last saved configuration by choosing **"6.1"** and restore the device into factory configuration by choosing **"6.2"**.

3.2.7 Version

User can check the hardware version and software version of the equipment.

DeSai Electric
SW 0.05   HW 1.0

3.2.8 Language Settings

After entering this menu, user can press UP/DOWN to choose language. The option with "*" mark in front is the current choice.

*English
中文

Chapter 4 NMS Setting

Network Management System Profile

Network management system is applied to digital TV equipment operation, control and management and parameters setting, etc. It centralizes digital TV equipment through network.

4.1 Installation

The software doesn't need special installation. User can just copy "Network Management Software X.XXY.exe" to the specified directory (X.XX is version number, Y represents language. For example: the version number of network management software 4.01E.exe is 4.01 English version) or place different versions of network management software to the same directory. When the network management software is running, it will generate two documents as follows:

l   Network management software X.XXY.log (It preserves the log file.)

l   Info. Bin (It's the user configuration data.)4.2 Software Operation

4.2.1 Login Interface

A login interface will pop up firstly when the software is running and give user prompts to input user name and password, the menu shows as follows:

User can login the NMS by pressing **Confirm** key after inputting user name and password. Upon the inputs, the software will verify them with database record automatically. If both of them are correct, the main interface will appear. Both of the default user name and password are admin.

4.2.2 Main Interface
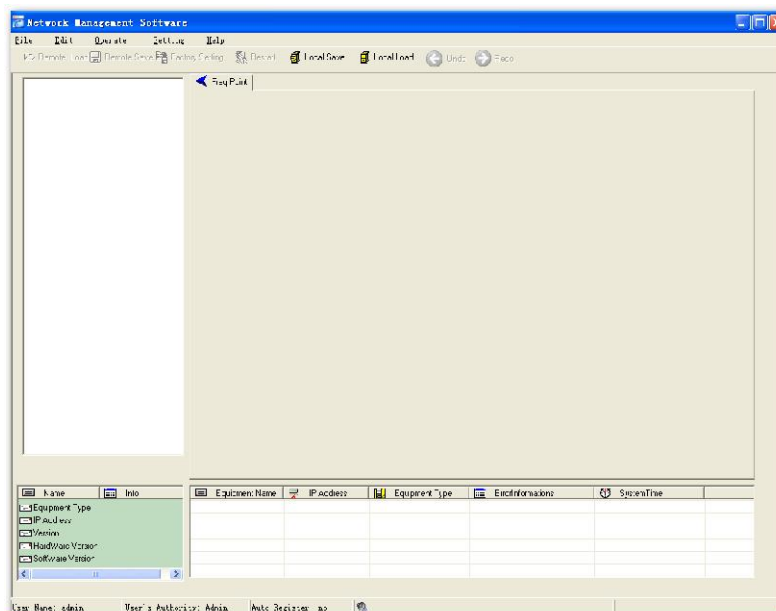
User can create a device node tree in the left column by adding, modifying and deleting the device node. This software provides a powerful node operation function, and the user can edit various parameters in the device tree for management and classification.

4.2.3 Adding Frequency Point
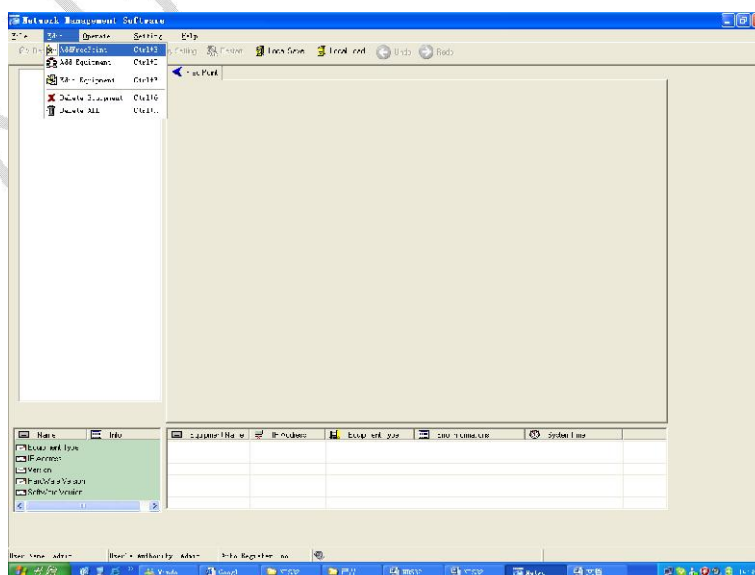
The Add Freq Point dialog box popes up when the user clicks the Add Freq Point item in the Edit pull down menu on the menu row. The device will confirm the given frequency while user clicks **OK**.


User can also click right mouse key to pop up the short-cut menu in device tree or in the left blank column, then the corresponding dialog box will pop up by choosing **Add Main Freq Point.** The device will confirm the given frequency while user clicks **OK.**
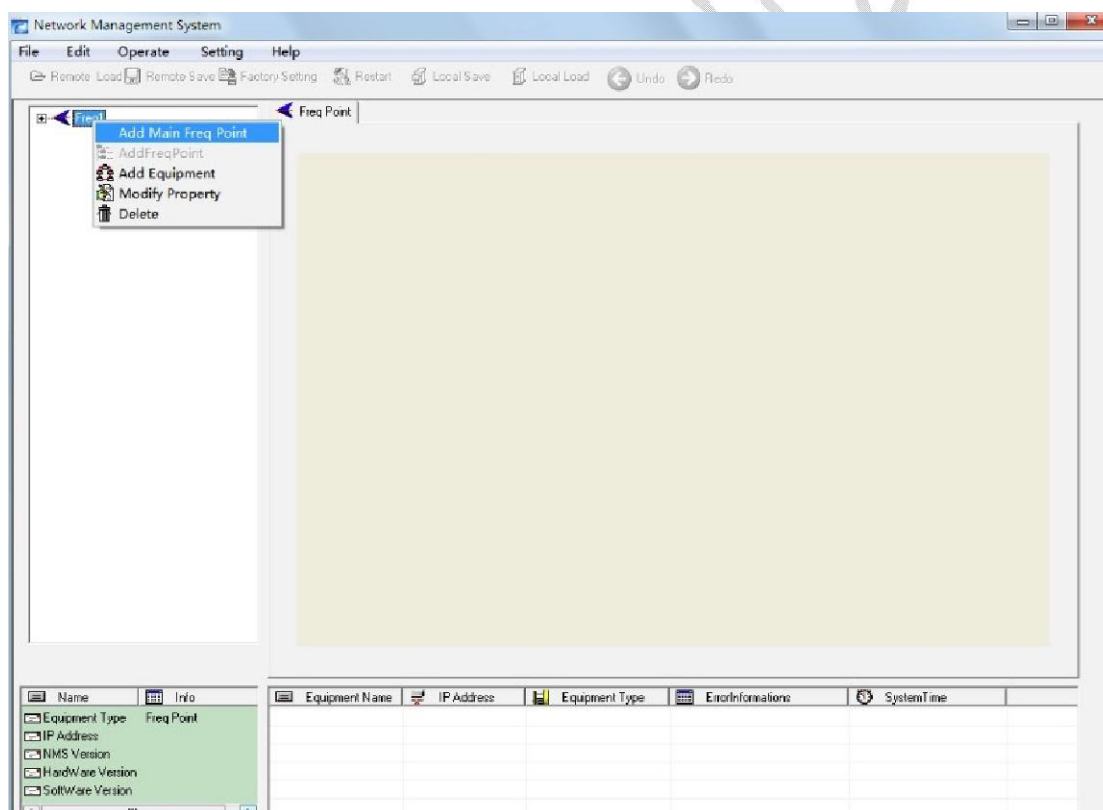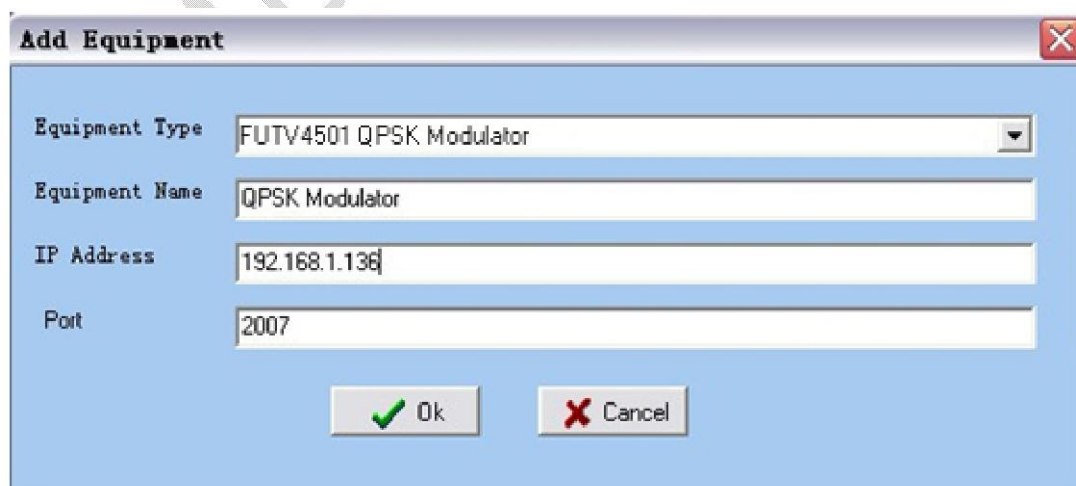
4.2.4 Adding Equipment under Given Frequency Point

User should choose the frequency point in advance, and then the dialog box of Add Equipment will pop up when user clicks "Add Equipment" item in the Edit pull down menu on the menu row.
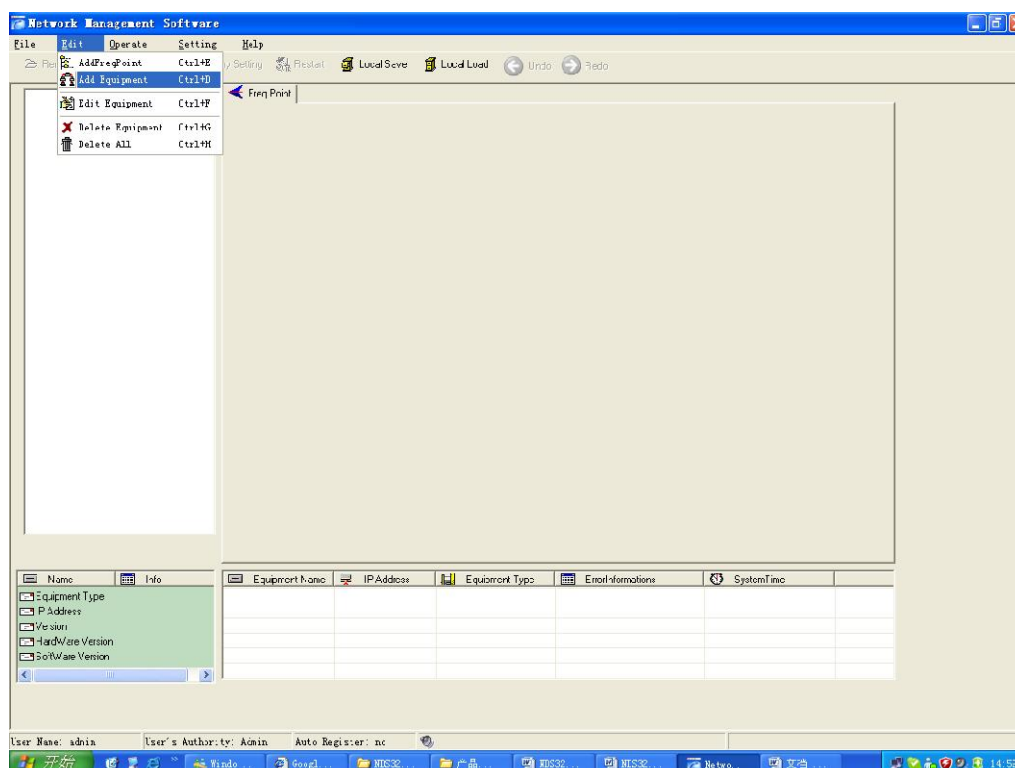
4.2.5 Edit Equipment Interface

User should follow the steps as below:

l   Choosing the connected equipment type in drop down list of "Equipment Type" by clicking the "   ".

l   Inputting the Equipment Name

l   Inputting the device IP Address

l   Inputting the device Port Number

l

4.2.6 Delete Equipment

User can choose the equipment to be deleted in the left column, and then click the "delete" item in the pull down menu which appears by clicking the right mouse key.
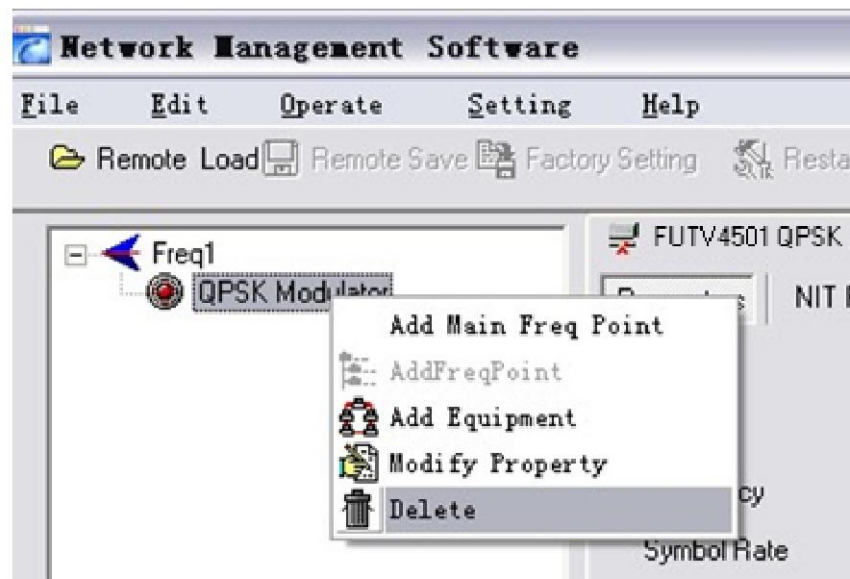
4.2.7 Save Configuration

After finishing all the parameters setting, user can click [Remote Save] button on the toolbar to save the modifications to the device's flash, while user can also reload the saved parameters from device's flash and refresh the device's parameters setting according to the loaded values by clicking [Remote Load]

Alternatively, user can also click the [Local Save] button on the toolbar to popup the "save file" dialog box, which gives prompts to save all the device's parameters as binary files in the computer's hard disk.

Similarly, user can choose to click the [Local Load] button on the toolbar to popup the read file dialog box, to read the stored binary file and set the device's parameters according to the loaded binary files.
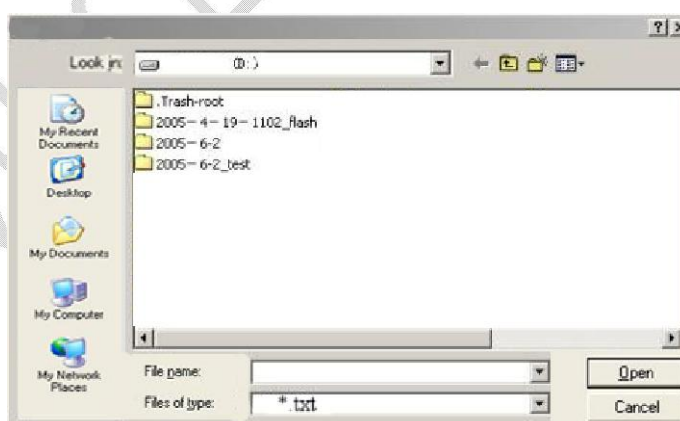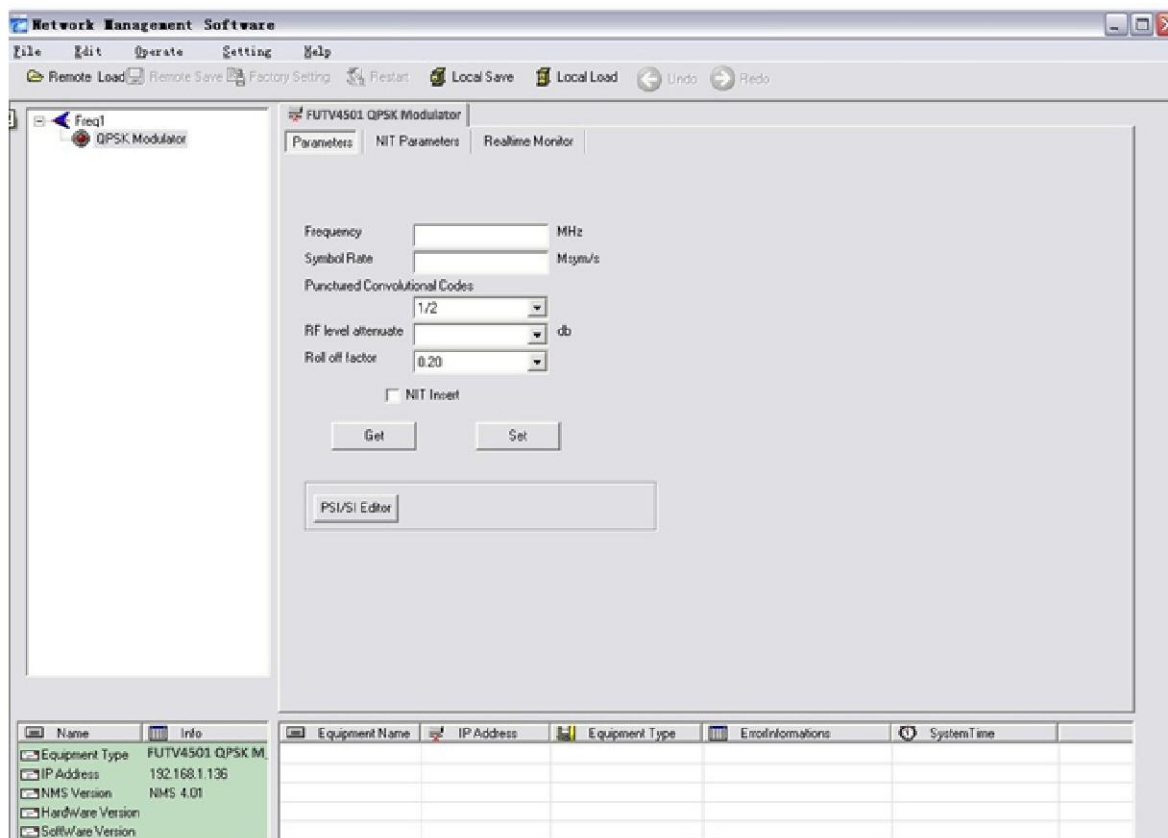
4.3 FUTV4501 QPSK Modulator Operation

User can choose the QPSK modulator in the device tree.

Set: making the current parameters, which show in the NMS software, activate.

Get: reading the current device's activating parameters and show them on NMS software.

4.3.1 Parameters

User can set the modulator's parameters at this table

4.3.1.1 **Frequency:** From 950 to 2150MHz adjustable

4.3.1.2 **Symbol Rate:** From 0 to 45MHz adjustable

4.3.1.3 **Punctured Convolutional Codes:** The possible convolutional options include 1/2, 2/3, 3/4, 5/6, 7/8.

4.3.1.4 **RF level attenuate:** From 0 to 20db in 1db step adjustable

4.3.1.5 **Roll off factor:** There are 3 possible options, including 0.20, 0.25 and 0.35.

4.3.1.6   NIT Insert: User can decide whether to insert a NIT table. The inserted NIT table will not take effective unless user select this checkbox. More details please refer to next section (4.3.2)

4.3.1.7   PSI/SI Editor:

PSI: Program Specific Information   SI: Service Information

User can add the NIT table by PSI/SI editor. However, it is not recommended to ordinary users. For the audiences don't have a good knowledge of the numerous NIT data.

4.3.2 NIT parameters
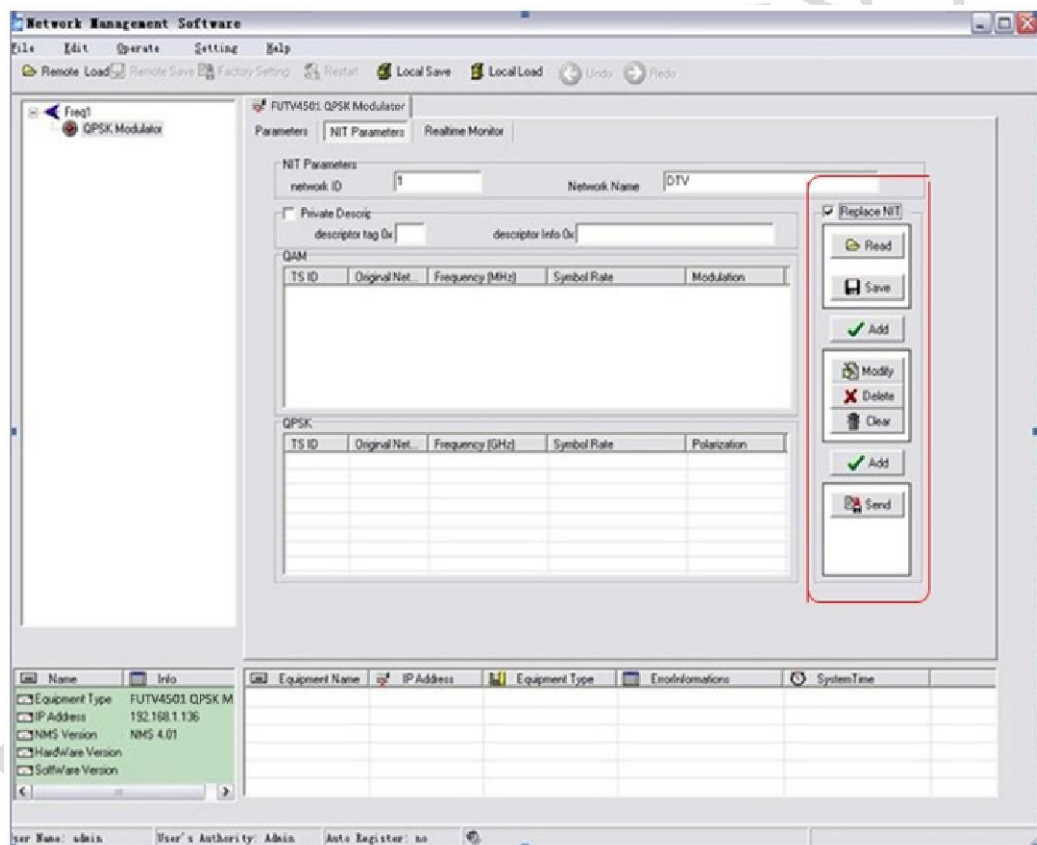
NIT: Network Information Table.

NIT table is a very important table for describing the network and TS.

NDS 3401 QPSK modulator has the function of editing a NIT table for the output.

4.3.2.1 NIT Parameters

User can set the network ID and network name in the field.

Network ID: the parameter describes the output TS's network ID

This is a 16-bit field which serves as a label to identify the delivery system, about which the NIT informs, from any other delivery system.

Network Name: the parameter describes the output TS's network name

Private Descriptor: this checkbox allows user to insert the private descriptor into the output TS. The private descriptor includes two parts. One is descriptor tag, and the other is descriptor information.

Descriptor tag: The descriptor tag is an 8-bit field which identifies each descriptor.

4.3.2.2 Editing NIT table

After selecting the checkbox, the NIT editing menu (circled by red line) is active. And also the device will insert the NIT table into the output TS.
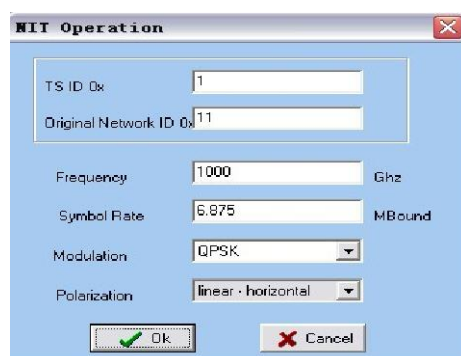
4.3.2.2.1 Read and Save

Those two buttons can trigger a window to load/save the saved NIT table file from/to a file on local computer hard disk.

What's more, user can also undo the NIT table which is lost or deleted by pressing READ button.

4.3.2.2.2 Add

There are 2 "Add" buttons on the editing toolbar. The upper one is for DVB-C network while the next one is for DVB-S (QPSK) network. By pressing the "Add" button, it will trigger an editing window. User can input the reference information in the illustration as below, and then click OK to confirm the addition.

4.3.2.2.3 Modify

The modify button will trigger a modify window and allow user to modify the selected items in the NIT table.

4.3.2.2.4 Delete

The "Delete" button will remove the selected items in the NIT table.
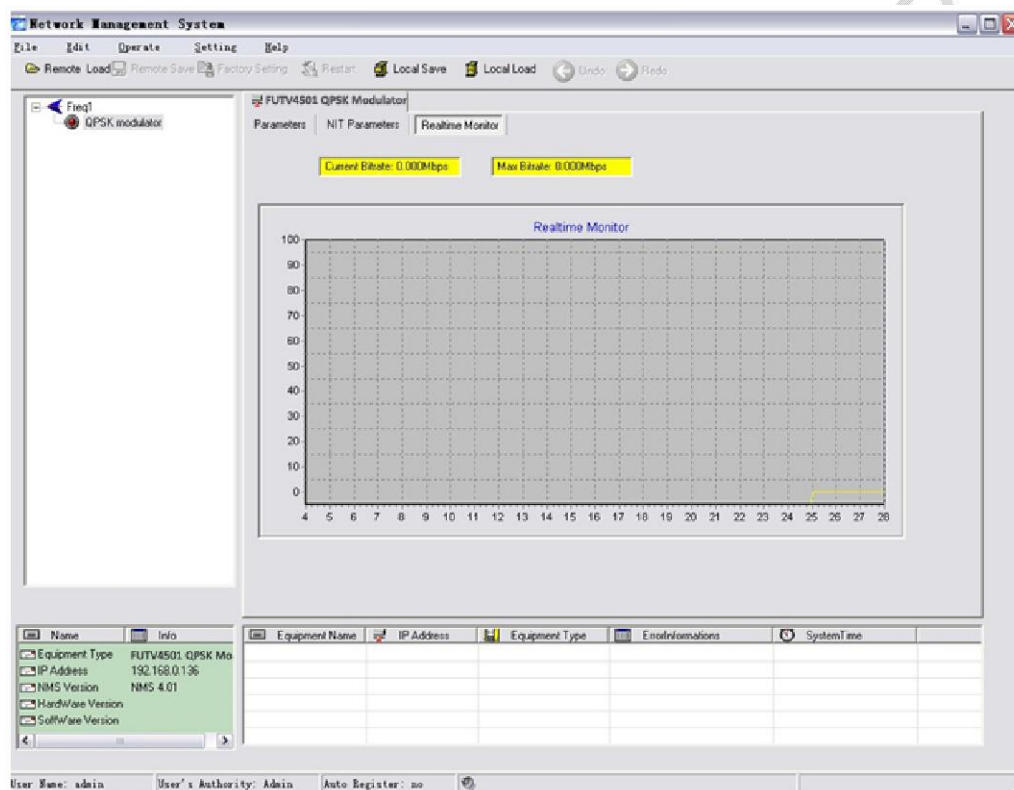
4.3.2.2.5 Clear

The Clear button will remove all the items in the NIT table.

4.3.2.2.6 Send

By selecting this button, user can send the saved NIT table files to the QPSK modulator.

4.3.3Real-timemonitor

The current total output stream and the number of output programs will be displayed on this table, and user can also clearly observe the changing output stream on it.

4.3.3.1 Current Bit-rate

This field indicates the output TS's real-time effective bit-rate.

4.3.3.2 Maximum Bit-rate

This field indicates the maximum bit-rate which output TS's real-time effective bit-rate ever reached.

Chapter 5 Troubleshooting

FMUSER's ISO9001 quality assurance system has been approved by CQC organization. For guarantee the products' quality, reliability and stability. All FMUSER products have been passed the testing and inspection before ship out factory. The testing and inspection scheme already covers all the Optical, Electronic and Mechanical criteria which have been published by FMUSER. To prevent potential hazard, please strictly follow the operation conditions.

Prevention Measure

l   Installing the device at the place in which environment temperature between 0 to 45 °C

l   Making sure good ventilation for the heat-sink on the rear panel and other heat-sink bores if necessary

l   Checking the input AC voltage within the power supply working range and the connection is correct before switching on device

l   Checking the RF output level varies within tolerant range if it is necessary

l   Checking all signal cables have been properly connected

l   Frequently switching on/off device is prohibited; the interval between every switching on/off must greater than 10 seconds.

Conditions need to unplug power cord

l   Power cord or socket damaged.

l   Any liquid flowed into device.

l   Any stuff causes circuit short

l   Device in damp environment

l   Device was suffered from physical damage

l   Longtime idle.

l   After switching on and restoring to factory setting, device still cannot work properly.

l   Maintenance needed

Chapter 6 Packing List

l   FUTV4501 QPSK modulator   1pcs

l   User's manual   1pcs

l   Power cord   1pcs

l   ASI wire   1pcs